Type I Progress Report
May 1973

a. "Use of Satellite Imagery for Wildland Resource Evaluation in the Great Basin."

b. GSFC Identification Number - U263

c. Statement of Problems: Most general problems have been solved. However, cloud cover continues to be a problem. Some frames are totally unusable due to the high cloud cover percent. It is felt that this problem will be greatly alleviated with the onset of clearer, spring and summer weather.

d. Accomplishments

The mapping and evaluation of pinyon/juniper ecotones is continuing. With the acquisition of high quality color composites from NASA, plus high resolution diazachrome transparencies prepared at the University of Nevada, this aspect of our investigation is becoming increasingly easier and the results are more precise. It is anticipated that we will finish this in the near future.

The inventory of wildfire scars is being continued and will be completed very shortly. Clear, good quality imagery from winter provides an excellent means by which these scars can be identified, as do the NASA color composites.

Pinyon/juniper chainings are also being inventoried on ERTS imagery. It has been found that snow cover is essential for the identification of these areas. It is impossible to identify these areas on summer or fall imagery.

A positive example of interpretation aided by snow cover is shown at Coils Creek. Coils Creek has been one of our intensive soils/vegetation study sites for the past 6 or 7 years. A detailed soils/vegetation map was compiled in 1969 (Blackburn et al)[1/] Later this map plus field trips were used to see if these same vegetation communities could be recognized on color, color infrared, and multispectral photography. Color infrared is available of this entire watershed at a scale of 1:24,000. Multispectral imagery is available at a scale of 1:62,500, from which color composites and enhancements were made to study this vegetation. NASA's RB57F flew the area in the fall with 9 sensors including color, color infrared,and black and white multispectral. These have been intensively studied. One vegetation ecotone could never be identified, even on the 1:24,000 color IR. This was a very sharp boundary

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1/ Blackburn, W.H., et al. 1969. Vegetation and soils of the Coils Creek watershed. College of Agriculture. University of Nevada/Reno.

between the big sagebrush and low sagebrush plant communities. This boundary can now be clearly identified on December 14, 1972, diazachrome color composites. An optimum amount of snow cover is felt to be the reason for this identification. This could only be accomplished by sequential coverage over the same areas by the ERTS satellite. There is no question that all dates add invaluable information for vegetation mapping. Obtaining coverage in different winters where snowpack varies will also provide additional information.

As another example, we have evaluated a relatively unsuccessful big sagebrush chemical control project occuring on the northern alluvial fan of Antelope Peak. The area involved is about 2 miles long and 1 mile wide with the chemical control accomplished in strips where sections between strips were left uncontrolled. This area is fairly easy to see on 1:108,000 color infrared imagery obtained in the fall. This area is not visible on diazachrome composites from ERTS in September, but is readily visible on December 14, 1972, ERTS black and white or color. The plant succession of this area can be monitored by ERTS from year to year as the area eventually returns to big sagebrush vegetation. Also, events such as flooding and apparent green-up of galleta grass in Monitor Valley (August 10 to September 15) have been noted using recently acquired color composites of this area.

As of this writing, the mapping of phreatophytic vegetation and agricultural lands has been accomplished using the black and white, 5 and 7 MSS bands. Some of the areas have been checked on diazachrome color composites. Mapping and quantification of acreages required approximately 10 man-hours for the entire state. Phreatophytic vegetation totaled 705,407 acres while agricultural lands totaled 772,334 acres. These data are assumed to be minimal because only highly reflective vegetation could be delineated and mapped. Much phreatophytic vegetation in Nevada is composed of brush types such as black greasewood, rabbitbrush and big sagebrush. These types exhibit relatively low reflectance, making subsequent

quantification very difficult, if not impossible.

We have had considerable communication with the land use planning coordinator for the State of Nevada concerning the use of ERTS-1 data for land use capability classification and resource inventory. Many investigations of this project will fit nicely into the new land use planning bill recently passed by the Nevada State Legislature. Many of the things that the land use planning bill intends to accomplish can be at least partly completed on ERTS imagery. We have given several formal and informal presentations on the feasibility of using ERTS-1 data for aiding state resource people in their studies.

The native meadow and hay meadow vegetation have been mapped in Elko County where it is most abundant. ERTS color composites taken in September were used for this inventory. The acreages and a map of these meadow types will be ready for the next progress report.

A Unisort card filing system is being implemented for our received ERTS imagery. This system allows one to choose frames on the basis of area covered, quality (as related to resolution, cloud cover, and exposure), physical features, and date. This is proving quite valuable in regard to the organizational aspect of this project.

e. Significant Results

Color composites and diazachrome transparencies of ERTS imagery have greatly increased our interpretation capabilities. Vegetation green-up and flooding due to late summer precipitation has been identified on such imagery. MSS imagery in all bands has not proven as valuable for similar determinations. Imagery obtained during the coming growing season should prove most valuable, and will enable us to correlate vegetation changes that we are monitoring with changes seen on ERTS imagery.

Snow cover has been found to be valuable in the identification of fire scars, pinyon/juniper chainings, and subtle ecotones not previously identified with any other type of imagery. It is felt that a greater understanding of the effects of snow cover on vegetation remote sensing will enable us to extend our capabilities relating to the mapping and identification of these resources.

Highly reflective phreatophytic vegetation has been mapped and quantified using the MSS 5 and 7 bands and diazachrome color composites. Approximately 10 man-hours were required to complete the entire state. Native meadow and hay meadow vegetation has been mapped in Elko County, Nevada, using ERTS imagery. Future plans include a statewide inventory of this resource.

f. No published articles, papers, pre-prints, etc., have been released during this reporting period.

g. No recommendation for practical change will be made at this time.

h. No changes have been made in our standing order forms.

i. Image Descriptor Forms - attached

j. Data Request Forms - none